

[54] **FOLDING DOOR FOR LUGGAGE COMPARTMENT OF VEHICLES SUCH AS MOTOR-COACHES FOR EXAMPLE**

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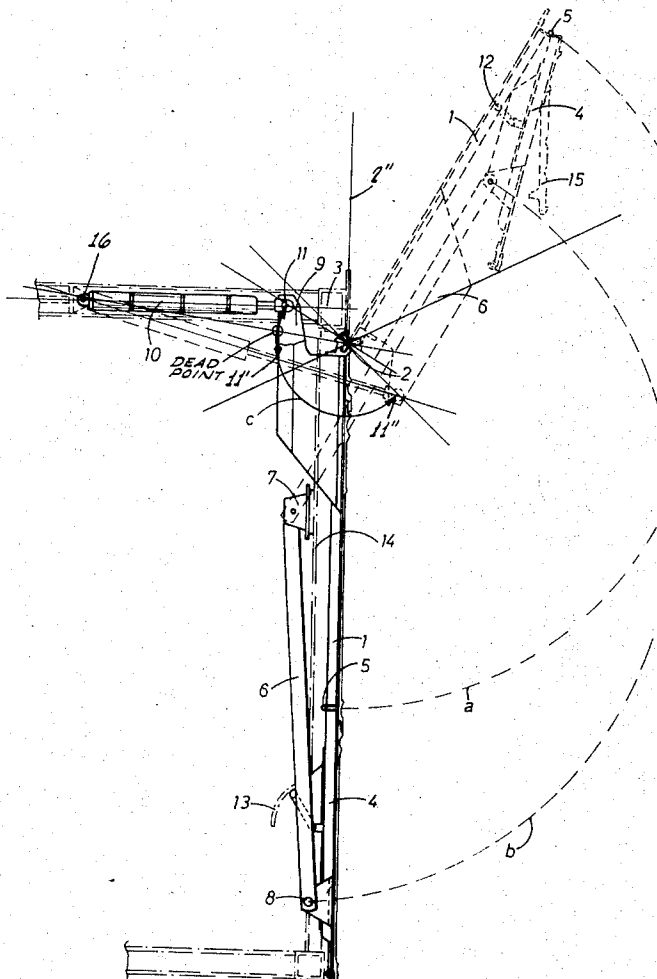
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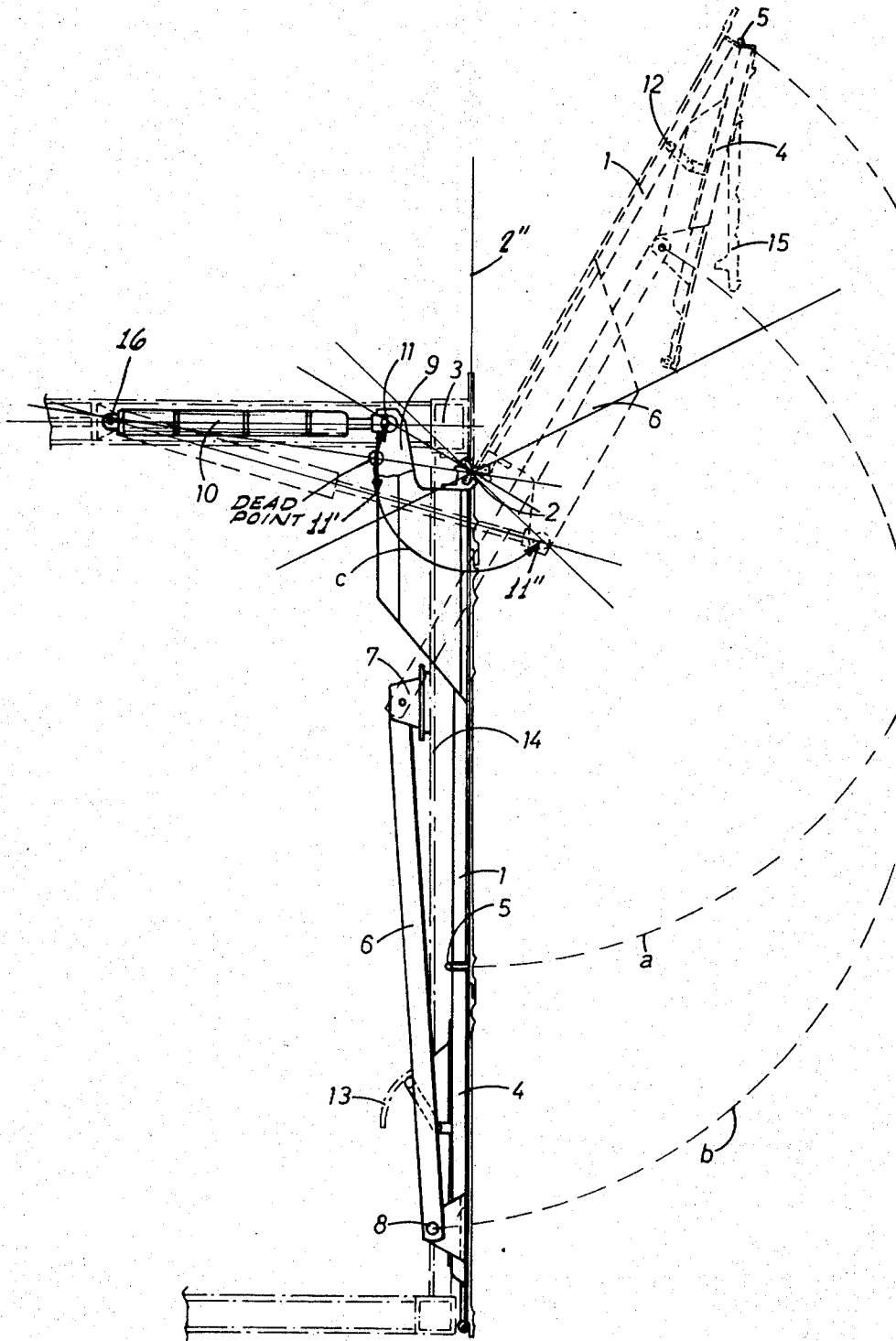
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[57] **ABSTRACT**

A folding door for the luggage compartment of vehicles comprises a pair of leaves pivotally interconnected to one another. The upper leaf is pivotally connected to the wall of the compartment, whereas the lower leaf is pivotally connected to the wall of the compartment. An actuating device is provided which is pivotally connected to the wall of the compartment at one end and also pivotally connected to a projecting arm projecting from the first leaf. The arrangement of pivotal connection of the leaves together with the actuator provides for a dead center position of the projecting arm of the first leaf. When the projecting arm is above the dead center position, the actuator acts on the projecting arm so as to close the leaves against the opening in the compartment. When the projecting arm is below the dead center position, the actuator acts to pull the projecting arm and thereby the first leaf away from the opening in the compartment.

3 Claims, 1 Drawing Figure





FOLDING DOOR FOR LUGGAGE COMPARTMENT OF VEHICLES SUCH AS MOTOR-COACHES FOR EXAMPLE

The present invention relates to a folding door for the luggage compartment of vehicles, particularly for motor-coaches or the like.

For some years there has been a tendency to increase the loading capacity of luggage compartment of motor coaches. An increase of the volume of these compartments entails increased height of the latter. In order to be able to utilize all the height available it is necessary for the door providing access to the compartment to be of the same height, and in the case of a door supported at the top the various manipulations of the door are made difficult and require considerable space for the movements necessary for opening and closing it.

The object of the present invention is a folding door which obviates these disadvantages.

For this purpose, according to the invention, the folding door comprises:

a first leaf or panel supported at one of its edges by means of a first articulation fastened on a fixed support, which may for example be situated on the edge of an opening or bay in the wall of the vehicle;

a second leaf or panel supported at one of its edges by means of a second articulation fixed on a part of the first leaf opposite the edge articulated to the fixed support of said first leaf;

at least one connecting rod, one end of which is articulated at a fixed point, for example on a wall of the vehicle, situated between the articulation supporting the first leaf and the articulation of the first leaf to the second leaf, the other end of the rod being articulated to the second leaf at a point situated at a suitable distance from the articulation of the second leaf on the first leaf. The entire assembly is so arranged that in the closed position the two leaves are situated substantially in the same plane and close the opening formed in the wall of the vehicle in such a manner that, when the door is opened, the two leaves are displaced along two different curved trajectories such that the first leaf pivots about the axis of its articulation on the fixed support, while the second leaf, while moving together with the first, pivots about its articulation on the first leaf, and in such a manner that in the open position the second leaf is folded against or at least in the direction of the first leaf occupying its open position.

In addition, the first leaf of the folding door is provided at its end articulated to the fixed support with one or more arms extending in the opposite direction to that in which the second leaf is situated, said arms being combined with a spring or pressure fluid actuator, in such a manner that in the closed position the door is slightly urged towards its closed position by said actuator, whereas on the opening of the door the actuator cooperates with the opening as soon as the point of articulation of the actuator arm has passed a dead center position, and then holds it in the open position. The second leaf is provided with a buffer and lock device cooperating automatically in the closed position with a buffer arm which is, for example, secured to the wall provided with the door opening, and in the open position with the first leaf.

Moreover, in the open position the folding door may be provided with a safety bolt which prevents it from closing unintentionally in the event of the failure of an actuator, while in the closed position the folding door may be provided with a locking system equipped with a handle occupying a projecting position in the event of the door not being correctly locked.

Provision may also be made for the articulation of the first leaf to the wall provided with the opening to be constituted by a band, for example an I-section band, (such as shown in Eichner U.S. Pat. No. 2,507,965) of any strong, flexible material, for example rubber or synthetic material; the heads of this section slide and are held in corresponding cavities in profiled bands fixed to the corresponding edges of the leaf and in the door opening, in order to ensure perfectly tight closing.

The folding door according to the invention makes it possible to gain access to the complete height of the compartment. On opening, this door travels over only about half the space which would be required to open a one piece door of the same height. Moreover, the force required to open or close this door is considerably reduced, since the center of gravity of the door does not move far away from the wall provided with the door opening. Provision may also be made for the door leaves to be advantageously covered with waterproof material, for example rubber or synthetic material, in order to ensure perfect sealing of the edges of the closed leaves and to enable said edges to be freely released on the opening of the door.

The accompanying drawing illustrates a preferred embodiment of the invention.

The single FIGURE of the drawing is a cross-section of a side wall of the luggage compartment at the point where the bay provided with the folding door is situated.

The drawing illustrates the folding door composed of a first leaf 1 supported at one of its edges by means of a first articulation 2 fastened on a fixed support 3, which may for example be situated on the edge of an opening formed in the wall 14 of the vehicle, a second leaf 4 supported at one of its edges by means of a second articulation 5 fixed to a part of the first leaf opposite to the edge articulated at 2 to the fixed support of the latter; at least one guide rod 6 one end of which is articulated at a point 7, for example on a wall 14 of the vehicle, situated between the articulation 2 supporting the first leaf and the articulation 5 of the first leaf to the second leaf, the other end of the rod being articulated to the second leaf 4 at a point 8 situated at a suitable distance from the articulation 5 of the second leaf on the first leaf. The entire arrangement is such that in the closed position the two leaves 1 and 4 are situated substantially in a common plane and close the opening formed in the wall of the vehicle, and in such a manner that upon the opening of the door the two leaves 1 and 4 are displaced along two different curved trajectories *a* and *b* such that the first leaf 1 pivots about the axis of its articulation 2 on the fixed support 3 in accordance with the curve *a* while the second leaf 4, while moving with the first leaf 1, pivots about its articulation 5 on the first leaf 1 in accordance with the curve *b*, in such a manner that in the open position the second leaf 4 is folded against or towards the first leaf 1 occupying its open position.

In addition, the first leaf 1 of the folding door is provided, at its end 2 articulated to the fixed support 3, with one or more arms 9 extending in the opposite direction to that in which the second leaf 4 is situated, said arm being combined with a spring or pressure fluid actuator 10 in such a manner that in the closed position the door is urged towards its closed position by the actuator 10, whereas upon the opening of the door the actuator cooperates with its opening as soon as the point of articulation 11 of the arm 9 on said actuator 10 has passed a dead center position in the trajectory c, and then holds it in the open position. The dead center position is defined by the position of the arm 9 when the articulation 11 is moved into an imaginary line joining the articulation 2 with the articulation 16 which pivotally joins the actuator 10 to the vehicle wall. The second leaf 4 is provided with a buffer and locking device 12 cooperating automatically in the closed position with a buffer arm 13 secured for example to the wall 14 provided with the door opening, and in the open position with the first leaf 1.

Moreover, in the open position the folding door may be provided with a safety bolt, not illustrated, which prevents the door from reclosing accidentally in the event of the failure of an actuator, and in the closed position the folding door may be provided with a locking system equipped with a handle 15 which will occupy a projecting position in the event of said door not being correctly locked.

The invention is obviously not limited to what has been described above and illustrated in the accompanying drawing, and modifications could be made to it without thereby departing from its scope.

I claim

1. A folding door for the luggage compartment of vehicles, said luggage compartment having a wall provided with an opening, said door comprising a first leaf having an edge and opposite end portions means for

pivotally connecting one of said end portions of the first leaf to said wall adjacent the opening, a second leaf having an edge and opposite end portions means for pivotally connecting one of said end portions of the second leaf to the other end portion of the first leaf, a connecting rod including opposite end portions, means for pivotally connecting one end portion of the connecting rod to said wall, means for pivotally connecting the other end portion of the connecting rod to the other end portion of said edge of said second leaf, said first leaf including a projecting arm extending transversely thereto, biasing means including opposite end portions, means for pivotally and permanently connecting one end portion of said biasing means to said projecting arm at a position which, with the door closed, is above the first said means, and means for pivotally connecting the other end portion of said biasing means to said wall, said projecting arm having a dead center position defined by its position when the means pivotally connecting the biasing means to the projecting arm is collinear with an imaginary line joining the means pivotally connecting the first leaf to the wall and the means pivotally connecting the biasing means to the wall, said biasing means acting on said projecting arm for urging said first leaf toward said opening when said projecting arm is above said dead center position and away from said opening when said projecting arm is below said dead center position.

2. A door as claimed in claim 1 wherein said biasing means includes a fluid actuator.

3. A folding door according to claim 1 wherein at least the means pivotally connecting the first leaf to the wall provided with the door opening is constituted by an I-section band of strong, flexible material, the heads of which slide and are held in corresponding cavities in section bands fastened to the corresponding edges of the first leaf and of the door opening, in such a manner as to ensure tight closure.

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